

## EBMWG Project Close-Out Report

**Project #:** AM 04

**Project Title:** ACTIVE ADAPTIVE MANAGEMENT IN EXPERIMENTAL WATERSHEDS – RESEARCH DESIGN

**Steering Committee Members:** Dan Cardinall, Audrey Roburn, Grant Scott, Wally Eamer, Bill Beese, Dorthe Jakobsen, Amy Beetham, David Flood, Ken Dunsworth, Melissa Todd, Michael Barkusky, Rod Negrave, Sari Saunders,

### 1.0 FUNDING

The estimated total cost of the project is \$35 000. Final invoice has been received and approved. Project will be completed within budget.

### 2.0 EXTENT TO WHICH PROJECT OBJECTIVES WERE ACHIEVED

This research design project evolved over its course with efforts to integrate with changing ecological management requirements within the legal Land Use Objectives (LUOs) and the shifting AM framework project. It was also difficult to coordinate with relevant projects being conducted in parallel (e.g. focal species, data management, and ecological baseline projects). The project coordinators (Saunders and Roburn) provided guidance regarding refinement of project objectives. The project contractors attempted to link focal questions to the Knowledge Summary and AMF documents of project AM02. All project objectives were address within a single, final project report: “Fenger, Howard, Loo and Holt. 2009. Adaptive Management in Experimental Watersheds – Research Design”.

Objective	Description	Evaluation (Text)	Summary*
1	Identify key ecological questions and knowledge gaps requiring multiscale (in space and time) scientific experimentation to support implementation of EBM and a framework of adaptive management.	<p>Consultant recommended a particular set of key ecological questions through an attempt to coordinate with other EBMWG projects.</p> <p>The degree of experimentation required to address these questions or, alternatively, the relative benefits and costs of experimentation relative to other approaches (passive adaptive management and monitoring, retrospective studies) was not considered on a question by question basis. These tradeoffs were generally discussed in introductory materials with recommendations for how to evaluate more specifically the need for experimental work.</p>	Partially Met
2	Identify data needs and compile data to support development of research design for answering scientific questions associated with ecological objectives of EBM.	Data needs (spatial and aspatial) were identified and data sets compiled for initial evaluation of potential treatment units. The adequacy of these baseline data sets was not fully evaluated specific to an experimental study (some examples given in section on logistic implementation issues). Recommendations were provided regarding what additional data should inform experimental design, though the availability of this information was not	Partially Met

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assessed.

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3	Provide an analysis, with supporting documentation of methodology, for identifying appropriate experimental units to address key ecological research questions.	An overview of the analytical procedure for identifying potential treatment units was provide through description of GIS procedures and data layers within “Appendix A: Findings of GIS Assessment Experimental watersheds”. The contribution of this analysis to development of the experimental design to address each key question was indicated. There was limited discussion of the rationale for choice of specific spatial or temporal units of experimentation and why this might vary by question. This may reflect the wording and development of the ToR, which implied an interest in a watershed-level focus.	Partially Met
4	Provide a study design for key ecological questions on the EBM land base.	General guidance was provided for delineation of study units. Guidance was provided regarding how to stratify treatments within a study and what categories of response variables would be appropriate for evaluating outcomes of the experimentation. Limited information was provided regarding appropriate sampling intervals and extents appropriate to a study (and given the scope of questions and size of the contract, requesting this level of detail may have been unrealistic). Next Step guidance indicated what further information must be obtained for operational establishment of a study.	Partially Met
5	Provide a synthesis of logistic and social issues that must be evaluated prior to research implementation.	Clear identification of barriers to effective AM research is included in the document along with suggestions on how to address these issues. <i>Comment</i> – The project contractors have provided discussion on implications of climate change and carbon storage and cycling, issues of emerging importance that should be given some research consideration for the EBM planning area.	Fully Met

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\* Use: Fully met (100%); Substantially met (75%-100%); Partially met (50-75%); Marginally met (25%-50%); Not met (0% - 25%)

### 3.0 MAJOR TASKS COMPLETED

Task	Description	Date
1	Developed project workplan (Note there was a delay in project initiation due to delay, internal to EBMWG and Coast Sustainability Trust processes, in ATF approval and contract issuance, which pushed back all project dates by about one month.)	Oct 31 2008
2	Developed draft background to and rationale for multiscale, experimental research program	Nov 10 2008
3	Draft report outlining (1) key ecological questions appropriate for study in a multiscale experimental framework; (2) measurable indicators and response variables to be evaluated in experimental research; (3) scales at which the ecological questions should be examined; (4) data required to identify appropriate experimental units for study.	Workplan update provided Dec 3 2008 which partly incorporated this information. Draft Procedures for GIS analysis and data layer needs delivered Jan 9 2009; Additional components within following deliverables;
4	Compilation of data (spatial and aspatial) for use in development of research design and associated metadata.	Provided with Research Project Review Draft March 5 2009
5	Draft report outlining (1) criteria for selecting experimental units; (2) approach to and results of analysis to identify appropriate experimental units; and (3) experimental research design for addressing key ecological questions on the EBM land base (4) logistic or social issues to be evaluated prior to research implementation. Jan 20 2009.	Research Project Review Draft March 5 2009
6	Provided weekly progress updates to project coordinators by email or phone and additional updates on specific tasks as requested.	Throughout term of project
7	Final Report incorporating above deliverables and revisions thereof based on review comments from Steering Committee members.	Received March 24 2009

### 4.0 KEY PRODUCTS

As per deliverables in Major Tasks Completed.

Final Report outlines key or priority questions that were identified through independent analysis of the contractors as well as coordination with other EBMWG projects (particularly Adaptive Management Framework). A four phase plan for investigating each of the key questions is provided. The report provides direction on GIS analysis and data acquisition required for development of a more detailed experimental design. The key questions identified fall within categories of hydroriparian integrity, terrestrial ecological integrity, and single species integrity. The report suggests a future focus on

implications of climate change and carbon storage and cycling within the EBM area. The project contractors also identify a number of logistic and social issues around effective development of these research programmes, including financial incentive to do AM research, consistent stakeholder support, determination of acceptable levels of proof of ecological impacts, research infrastructure, and data development and acquisition.

## 5.0 PEER REVIEW

Internal EBMWG peer review of project methods and results is a fundamental part of the EBMWG's approach to peer review. Project coordinators Saunders and Roburn provided joint comments to the contractors, and steering committee member David Flood also provided comments to the contractors.

The final report for this project has not been externally peer-reviewed. The project coordinators, in consultation with the Steering Committee members, decided not to pursue external peer review at this time for the following reasons: (1) insufficient time for external reviewers to provide feedback before final document was due; (2) benefits of further review of the experimental design and its current level of detail were not clear; (3) uncertainty regarding the institutional and funding framework within which these research projects would be undertaken reduced the ability of academic and operational reviewers to comment effectively; (4) uncertainty regarding the final structure of the legal LUOs reduced the ability to evaluate these questions relative to the legal mandate of operators and First Nations communities in the EBM planning area.

## 6.0 MAJOR FINDINGS

The consultants provided the following **Summary Recommendations**:

1. Engage an independent research team to overview future implementation of EBM. Although this and various other EBM working group projects have attempted to lay the path to AM implementation, actual implementation will be dependent on the individuals holding the reins in the future.
2. Use the key questions and the phases outlined to begin the research projects. The projects identified are considered to support information needed to answer the highest priority questions. Use the experimental design provided here to begin to implement research on the specific questions.
3. Use robust existing information to assess current policy. Phase 1 of the process is intended to aid in this process of applying research to policy by getting agreement on use of robust information. This initial phase is meant to avoid spending money without agreement to use the information in decision-making.
4. Consider the entire area as an experiment that began with the first harvesting and initially focus research on the key questions through retrospective studies (Phase 3) by looking for treatment units and evidence already available through sampling from within the area. Test research design and pilot field studies initially through sampling that compares baselines of natural forest ecosystems to ecosystems where the impacts of development are highest. If the sample design cannot detect differences in response variables in these ecosystems, then review approach and possible next steps.
5. Use GIS as a major support tool to find sample sites and to randomize sampling. We do not recommend at this time focusing research on a small number of permanent 'research watersheds'. Instead, the report recommends using watershed units to find benchmark sites and treatment units for sampling and comparison purposes specific to each research question. After a period of familiarization with research studies and a number of watershed databases it may become apparent that some specific watersheds do provide many of the features needed for sampling. At

that time it may be appropriate to establish some long-term research watersheds. However, we are unable to make such a recommendation at this preliminary stage.

6. Assess and report risk based on existing knowledge within the context of uncertainties. The research will provide insight into risk and loss of ecosystem integrity. Assessment and reporting on risk is more likely assured if linked to periodic government obligated processes such as Timber Supply Review and Forest Stewardship Plan preparation and approvals.
7. Acknowledge that a research program in temperate rainforest will deliberately explore the question of natural capital and living off nature's interest. This is central to maintaining both sustainable communities and ecosystem integrity, and in avoiding "boom and bust" cycles. Maintaining natural capital is consistent with EBM vision for understanding what low risk ecosystem means and adapting management to that.

## **7.0 STEERING COMMITTEE RECOMMENDATIONS**

With respect to the Final Active Adaptive Management Research Design, the project steering committee recommends the following actions to the LRF:

1. Post the final report to the EBMWG website.
2. Ensure the report is reviewed by the AM steering committee (and staff, as per the AMSC Terms of Reference) as guidance in developing an experimental adaptive management program. The AMSC should consider additional peer review if they feel it is warranted.
3. Finalize documentation of spatial and aspatial ecological data applicable to the planning region. Ensure data and all associated metadata are housed efficiently, documented online, and available for use (see DS-01 Data Management report recommendations).

## **8.0 RELEVANCE/SIGNIFICANCE FOR EBM IMPLEMENTATION**

The AM04 report:

1. Highlights gaps in data needed to evaluate priority research questions and establish experimental and monitoring protocols.
2. Highlights the importance of a central data warehouse with accessible data and metadata and data access procedures in place in order to conduct future evaluation of experimental units on this landbase.
3. Emphasizes the critical need for long term commitment with respect to institutional infrastructure, data development and documentation, and analytical and managerial personnel to develop and maintain an informative research programme on this landbase.
4. Provides helpful guidance on research program content and procedural recommendations for developing an adaptive management program for key ecological integrity questions relevant to ecosystem-based management in the North and Central Coast.